

continuing education for health professionals to facilitate a positive attitude toward breastfeeding and working, and 3) to influence work environments and day care settings that will provide a supportive atmosphere for the working mother. The three-part strategy for this project includes a maternal breastfeeding education and support network comprised of local women who have previously breastfed successfully and continued breastfeeding after return to work; a staff education component to provide information on breastfeeding, particularly on issues that relate to working women; and a program to facilitate changes in the child care and employment settings to accommodate breastfeeding women who return to work.

RESEARCH

Recommendation: Expand research in human lactation and breastfeeding

In order to improve the information base, establish policy, improve and target strategies, assess program effectiveness, and determine progress in achieving goals related to the promotion of breastfeeding, an intensified national research effort with a broad range of research studies is essential. This recommendation focuses on the need for basic studies, clinical studies, evaluation of information studies, and prospective and longitudinal studies related to breastfeeding. Although research related to lactation and breastfeeding has received considerable attention and support in recent years, the Surgeon General's Workshop reaffirmed the importance and need for continued and expanded research efforts. Federal agencies within the Department of Health and Human Services which support research in maternal and child health, especially the National Institute of Child Health and Human Development of the National Institutes of Health and the Division of Maternal and Child Health of the Health Resources and Services Administration, include lactation and breastfeeding as priority areas for competitive grant support. In addition, the United States Department of Agriculture supports a significant number of research efforts related to human lactation.

The various studies — underway, planned, or recently completed — seem to focus on the following areas: the collection of data on incidence and duration of breastfeeding; determinants and factors related to breastfeeding behavior, practices, and attitudes; physiological, nutritional, and other aspects of human lactation; and the development and evaluation of interventions and strategies to promote breastfeeding. Examples of research studies in each of these areas are provided below.

Trend Data

Many Maternal and Child Health programs and Women, Infants, and Children programs in state and local health agencies are collecting data to determine the incidence and duration of breastfeeding. For example, the Montana State Department of Health and Environmental Sciences is involved in an ongoing pediatric nutrition survey that provides for statewide monitoring of breastfeeding. A survey of infant feeding practices, using a sample drawn from birth certificates, is underway in the Section of Family Health of the Alaska Department of Health and Social Services. The Nebraska and Tennessee Nutrition and Women, Infants, and Children programs are collecting similar data through their surveillance systems.

Numerous community health centers in different geographic areas are gathering baseline data to use in planning intervention strategies.

The Maine Newborn Breastfeeding Surveillance Program monitors the rate of breastfeeding of newborns in all hospitals in Maine using data from the mandatory newborn screening program for metabolic disorders.

Significant national studies are either continuing to collect or update data, and earlier data are being analyzed, published, and disseminated. Such efforts included the Ross Laboratories National Mothers Survey and the Department of Health and Human Services/National Center for Health Statistics' National Survey of Family Growth, National Health Interview Survey-Child Health Supplement, National Natality Survey, and Health and Nutrition Examination Survey.

Determinants/Behaviors/Practices/Attitudes

Behavioral and attitudinal determinants of breastfeeding are the focus of many current research projects. Some of these research projects are mentioned below:

- "Factors Affecting Breastfeeding Duration," a study at the Department of Human Nutrition and Food Service Management, University of Nebraska, conducted by Nancy Lewis and H.M. Fox, focused on the development of a method to identify women who plan to breastfeed but either do not initiate it or stop breastfeeding within two months postpartum. Subjects included 45 WIC program participants who were surveyed by telephone within one year after their babies were born. The survey questionnaire used was designed to identify factors related to breastfeeding success.
- At the University of California at Berkeley, Barbara Vandenberg is investigating the effects of breastfeeding on the health and development of infants. This epidemiological study, "Breastfeeding: Evaluation of Antecedents and Effects," is supported by a National Institute of Child Health and Human Development grant.
- "Infant Feeding Beliefs and Practices of First-time, Inner City Mothers" was the title of a study conducted by Elizabeth Burki and Janet Reis at Northwestern University (IL) and reported in *WIC CURRENTS* (Ross Laboratories). Using a sample of 19 clients from an inner-city clinic that provides health care services primarily to medically indigent Black and Hispanic families, interviews were conducted in prenatal and postpartum clinics. Specific aspects of concern were the accuracy of mothers' knowledge of feeding tasks and understanding of an infant's feeding needs, sources of information or influence for tasks and problems related to infant feeding, and attitudes and influences that affected the decision to breastfeed or bottle-feed the baby.
- "Determinants of Infant Feeding: Breast vs. Bottle" is the subject of a study being conducted by Ruth Faden at Johns Hopkins University School of Public Health (MD). It is jointly supported by the Division of Maternal and Child Health and the National Institute of Child Health and Human Development. The study seeks to identify major determinants of infant feeding behavior in new mothers, and, for mothers electing breastfeeding, the major determinants of duration of breastfeeding. Both urban and rural subjects are included in the study.

- "Maternal Employment and Breast-Feeding: A Study of 567 Women's Experiences," conducted by K.G. Auerbach and others at the University of Nebraska Medical Center, was published in the *American Journal of Diseases of Children* in 1984.
- "The Decision to Breastfeed: A Study of Low-Income MIC Patients in New York" was carried out by Donna O'Hare and others, and presented at the 1984 annual meeting of the American Public Health Association. The study surveyed the choice of infant feeding method of 909 women enrolled at eight Maternity and Infant Care-Family Planning Project Clinics during Spring and Summer 1984. The findings substantiated those of other investigators and found that the majority of women make the decision to breastfeed prior to pregnancy.
- "Economic and Demographic Determinants of Infant Feeding" is one component of the Rand Corporation's (Santa Monica, CA) ongoing population studies funded by the National Institute of Child Health and Human Development.
- "Infant Feeding Practices Among Primiparae" is a prospective study of the frequency and duration of infant feeding practices, being conducted by Survey Research Associates, Inc. of Baltimore, MD, with support of the National Institute of Child Health and Human Development.
- Sharron Humenick at the School of Nursing of the University of Wyoming in Laramie is conducting "A Study of Early Management of Breastfeeding."
- "Infant Feeding Practices Tracking Study" is supported by the Department of Health and Human Services/Food and Drug Administration. It is intended to provide information about the prenatal and postnatal influences upon infant feeding plans and behaviors, and to provide detailed real-time (i.e., not retrospective) information about actual feeding practices.
- "Mother-Infant Social Interaction During Breastfeeding" is a study being conducted by Lawrence Hoder at the Clinical Nutrition Research Center at Yale University with support from the National Institutes of Health.
- "Determinants of Mothers' Infant Feeding Practices" was the subject of a study by Steven Wirtz at Brigham and Women's Hospital in Boston, MA.
- "Attitudes of Migrants toward Breastfeeding" is a survey being conducted by David Myers at Plan de Salud del Valle, Inc. in Fort Lupton, CO.

Physiology/Nutrition/Other Aspects

A wide variety of studies on the physiological, nutritional, and related aspects of human lactation and breastfeeding are in process. Mentioned below are some of these studies:

- In followup of the Surgeon General's Workshop, the National Institute of Child Health and Human Development announced a Request for Applications for investigator-initiated research grant applications for studies on the physiology of lactation and the biology of human colostrum and milk. It was recognized that a concerted effort was needed to explore the physiological processes occurring in the breast, from the time of conception through lactation and weaning, in order to understand the development and function of lactating tissue. Concomitantly, the functional

properties of colostrum and human milk need to be evaluated in the context of the roles they play in infant development.

- The recommendation of the Surgeon General's Workshop for intensified research to provide data on the benefits and contraindications of breastfeeding led the National Institute of Child Health and Human Development to sponsor the Workshop on Methods of Analysis of Human Milk and Colostrum. Following this workshop a Request for Proposal was announced on this topic for research to develop highly accurate microtechniques to determine the composition of human milk and to validate the techniques on human milk. It is anticipated that multiple awards will be made in 1986.
- The Department of Health and Human Services/National Institutes of Health, primarily through the National Institute of Child Health and Human Development, supports numerous other research projects related to physiological, nutritional, and other aspects of human lactation and breastfeeding. A list of these projects is provided in Appendix B under the following categories: physiology of lactation, maternal nutrition aspects, infant physiology, infant nutrition aspects, composition of human milk, immunological aspects, and human milk banks.
- The National Institute of Child Health and Human Development will sponsor an international conference on the Effects of Maternal and Environmental Factors of Human Lactation to be held January 15-19, 1986, in Mexico. It is expected that new research initiatives will emanate from this meeting.
- Drugs in breast milk continued to be studied by John T. Wilson and other staff of the Departments of Pharmacology and Therapeutics and Pediatrics at Louisiana State University. A recent paper, "Pharmacokinetic Pitfalls in Estimation of the Breast Milk/Plasma (M/P) Ratio for Drugs" was submitted for publication in late 1984.
- In cooperation with Purdue University, a followup study, entitled "Nutritional Intake of Breastfed Infants Especially Related to Vitamin B6, Folic Acid, and Ascorbic Acid" is underway at Ball State University in Indiana.
- A variety of research related to human lactation and breastfeeding is supported by the United States Department of Agriculture, principally through its Human Nutrition Research Centers and Agricultural Experiment Stations. A list of research studies related to human subjects is provided in Appendix C.

Interventions/Strategies

Other research activity centers around the value of different interventions and strategies in promoting breastfeeding. A couple of examples are listed below:

- "Breastfeeding Promotion in a Low-Income Population" is a Title V Maternal and Child Health Improvement Project conducted by Lindsey Grossman at Ohio State University. This project will identify factors associated with the decision by poor women to breastfeed; identify and test interventions designed to increase breastfeeding in low-income women, such as postpartum lactation support provided by a peer-mentor and education aimed at the mother's key support person; and test the

generalizability of those interventions in a wider but demographically similar clinical setting.

- “A Randomized Trial to Promote the Duration of Breastfeeding” is the subject of a study at Boston University School of Public Health and Boston City Health and Hospitals by James Sorenson and Deborah Frank with support from the National Institute of Child Health and Human Development.

NATIONAL AWARENESS

The positive impact of the Surgeon General's Workshop on Breastfeeding and Human Lactation continues to be observed and experienced throughout our nation. This is largely due to the diverse group of individuals, agencies, and organizations in the private and public sectors who are responding to the challenge of the workshop's recommendations. Participants in the workshop, as well as others who have learned about it through the widely disseminated Workshop Report, have extended the workshop messages to a much broader audience. The Healthy Mothers, Healthy Babies Coalition's Breastfeeding Subcommittee serves as the ongoing focal point for collecting and disseminating information about breastfeeding promotion activities and facilitating new efforts. One of its future efforts will be a poll to determine public attitudes about breastfeeding.

Following are selected examples of the variety of efforts made to increase awareness of the national breastfeeding objective and to stimulate followup in communities across the nation:

- Since January 1984, the journals of several professional organizations included articles on breastfeeding and reports of the Workshop. These include The American Dietetic Association (18 articles), American Academy of Pediatrics (19 articles), National Association of Pediatric Nurse Associates and Practitioners (1 article), Nurses Association of the American College of Obstetricians and Gynecologists (3 articles), American College of Obstetricians and Gynecologists (2 articles), American Public Health Association (1 article), American Academy of Family Physicians (1 article), and National Perinatal Association (1 article).
- Reports of the Workshop also appeared in such journals and newsletters as the following:
 - Perinatal Section News*, American Academy of Pediatrics, Vol. 10, No. 1, January, 1985 (Vince L. Hutchins).
 - Morbidity and Mortality Weekly Report*, Centers for Disease Control, December, 1984 (James S. Marks).
 - Public Health Reports*, Vol. 99, No. 6, November-December, 1984 (Joyce Arango, C. Everett Koop, and Elizabeth Brannon).
 - Occupational Health Nursing*, February, 1985 (Marybeth Petschek and Rosemary Barber-Madden).
- The popular press also provided information about breastfeeding. Examples include:

Good Housekeeping, April, 1985 (David Zimmerman).
Clothed with the Sun, Vol. 4, No. 3, Autumn, 1984.

- Other awareness events included: emphasis on breastfeeding at meetings of national and state professional organizations, such as the Second Annual Conference of the National Association of Women, Infants, and Children Directors (with a presentation at the plenary session and two workshops on promotion of breastfeeding); the 1984 annual meetings of the American Public Health Association (where 25 papers were presented in five sessions); the American Dietetic Association (where four presentations were made on breastfeeding); the American Medical Women's Association (where three speakers presented a two-hour panel on "Breastfeeding: Who Does, Who Doesn't and Why?"), and the National Perinatal Association (which included a session on this topic). La Leche League International sponsored a three-day national conference on breastfeeding.

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The information abstracted in this report was received from many different individuals, organizations, and agencies in the public and private sectors. Names and addresses of individuals and agencies who forwarded materials and information directly to the Surgeon General's Office, or to the Division of Maternal and Child Health in Rockville, MD are listed below. In addition, the name of a contact person and address of each Department of Health and Human Services Regional Office is provided, since staff in these offices collected and summarized considerable material and information submitted by the states they serve.

If additional information is desired, inquiries should be directed to the state health agency or the Department of Health and Human Services Regional Office which serves the state in which the activity occurred, or to the specific individual or agency, identified below.

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APPENDIX A

TASK FORCE ON PROFESSIONAL TRAINING IN LACTATION

MODEL POLICY STATEMENT*

Promotion of Breastfeeding in the Context of Health Care: Professional Training Priorities

Health care professionals, as the source of comprehensive health services for women and infants, should provide leadership in education regarding the benefits of breastfeeding as the optimum nourishment of infants, in order to facilitate an informed choice of infant feeding. Their professional training should include: emphasis on lactation as a physiologic component of the reproductive cycle, on human milk as an ideal natural and economic food during infancy, on breastfeeding as a central part of family life, and on coordination of other community resources available to the family. This training should enable health professionals to provide skilled services to assist in the preparation, initiation, and continuation of breastfeeding. Such training should be integrated into the continuum of health care.

It is imperative for health care professionals to receive adequate basic and ongoing theoretical and practical training in lactation and breastfeeding, and to develop skills which have cross-cultural application in patient education and the management of breastfeeding.

GOAL OF THE TASK FORCE

To identify and reduce barriers which keep women from beginning or continuing to breastfeed their infants. (Based on the Surgeon General's charge to the Surgeon General's Workshop on Breastfeeding and Human Lactation.)

* This statement was prepared by the Task Force on Professional Training in Lactation, June 1985. The following organizations and agencies are members of the Task Force: American Academy of Family Physicians, American Academy of Pediatrics, American College of Nurse-Midwives, American College of Obstetricians and Gynecologists, American Dietetic Association, American Home Economics Association, American Hospital Association, American Medical Association, American Nurses' Association, American Public Health Association, American Society of Clinical Nutrition, Association for Maternal and Child Health and Crippled Children's Programs, Association of Teachers of Maternal and Child Health, La Leche League International, March of Dimes Birth Defects Foundation, National Association of Community Health Centers, National Association of Pediatric Nurse Associates and Practitioners, National Perinatal Association, National Rural Health Care Association, Nurses Association of the American College of Obstetricians and Gynecologists, U.S. Department of Agriculture/Food and Nutrition Service, and U.S. Department of Health and Human Services/Health Resources and Services Administration.

OBJECTIVES OF THE TASK FORCE

- 1) By 1990, didactic and clinical training in lactation and breastfeeding will be integrated within existing required curricula of health professional schools, particularly in medicine, nursing, and dietetics.
- 2) By 1990, all advanced training programs (e.g., graduate education and residencies) of health professionals providing services for women and children shall include appropriate content on management of breastfeeding and lactation.
- 3) By 1990, continuing education programs and publications offered by appropriate professional organizations at the national, state, and local levels will include lactation and breastfeeding as part of a regular educational cycle for health professionals in practice.
- 4) By 1990, health care facilities and professional organizations involved in the training of health care professionals will develop and implement guidelines for updating current practices within the health care system in order to support optimal breastfeeding and lactation management, and serve as an effective training field.
- 5) By 1990, professional organizations shall provide a means for self-assessment of their membership to identify gaps in knowledge, skills, and practice of the management of breastfeeding and lactation.

APPENDIX B

RESEARCH ON HUMAN LACTATION AND BREASTFEEDING SUPPORTED BY THE NATIONAL INSTITUTES OF HEALTH, DEPARTMENT OF HEALTH AND HUMAN SERVICES*

Physiology of Lactation

- "Symposium on Nutrition and Lactation," Margaret C. Neville, University of Colorado Health Sciences Center, Denver, CO.
- "Physiological Factors Affecting Human Lactation," Margaret C. Neville, University of Colorado Health Sciences Center, Denver, CO.
- "Mechanisms in Nutrient Transport into Cells," Margaret C. Neville, University of Colorado Health Sciences Center, Denver, CO.
- "Filamentous Proteins in Milk Synthesis and Secretion," Robert F. Loizzi, University of Illinois, Chicago, IL.
- "Hormonal Control of Metabolism in the Mammary Gland," James A. Rillema, Wayne State University, Detroit, MI.
- "Neural and Hormonal Regulation of Lactation," Clark E. Grosvenor, University of Tennessee, Memphis, TN.
- "Neurochemical Control of Oxytocin Release," Clark E. Grosvenor, University of Tennessee, Memphis, TN.
- "Control of Gonadotropin Secretion During Lactation," Susan M. Smith, University of Pittsburgh, Pittsburgh, PA.
- "The Physiologic Control of Prolactin Secretion," Jimmy D. Neill, University of Alabama, Birmingham, AL.
- "Bioactive Forms of Prolactin: Regulation of Secretion," David M. Lawson, Wayne State University, Detroit, MI.
- "Regulatory Cell Biology of Prolactin Targets," Janet M. Nolin, University of Richmond, Richmond, VA.
- "The Effect of Hyperprolactinemia on Cyclic LH Release," Phyllis M. Wise, University of Maryland, Baltimore, MD.
- "Central Regulation of Oxytocin Secretion," Edwin W. Haller, University of Minnesota, Duluth, MN.
- "Immunochemical Analysis of Estrophilin in Mammary Gland," Thomas C. Allen, University of Louisville, Louisville, KY.
- "Improving Estimate of Length of Postpartum Amenorrhea," Kathleen Ford, Johns Hopkins University, Baltimore, MD.
- "Predictors of Ovulation in Lactating Women," Ronald H. Gray, Johns Hopkins University, Baltimore, MD.

* Source: Federal Human Nutrition Research and Information Management System, 1984.

- "Postpartum Effects of Adolescent Pregnancy," Mark E. Wilson, Emory University, Atlanta, GA.
- "Sex Hormones in the Regulation of Calcium Homeostasis," Mary L. Thomas, University of Texas Medical Branch-Galveston, Galveston, TX.
- "Vitamin D and Calcium in Lactating and Suckling Rats," Svein U. Toverud, University of North Carolina, Chapel Hill, NC.
- "Vitamin A Transport during Lactation," Alta C. Ross, Medical College of Pennsylvania, Philadelphia, PA.
- "Vitamin D Metabolism during Reproduction," Susan K. Paulson, Northwestern University, Chicago, IL.
- "Nutritional Role of Manganese Binding Molecules in Milk," Wai-Yee Chan, University of Oklahoma, Oklahoma City, OK.

Maternal Nutrition Aspects

- "Mechanisms by which Malnutrition Affects Lactation," Kathleen M. Rasmussen, Cornell University, Ithaca, NY.
- "Supplemental Fluids and Breast Milk Production," Lois B. Dusdeiker, University of Iowa, Iowa City, IA.
- "Lactation: Diet, Drinking, Smoking, and Infant Growth," Ruth E. Little, University of Washington, Seattle, WA.
- "Transfer of Persistent Chemicals to Offspring," John J. Lech, Medical College of Wisconsin, Milwaukee, WI.
- "Longitudinal Study of Zinc Nutrition in Pregnancy and Lactation," Michael K. Hambidge, University of Colorado Health Sciences Center, Denver, CO.
- "Mothers and Newborns Admitted for Cholesterol Homeostasis on Breast and Formula," Lisa C. Hudgins, Rockefeller University, New York, NY.

Infant Physiology

- "Milk and Amniotic Fluid Surfactants in Gastrointestinal Development," L.M. Lichtenburger, University of Texas Health Science Center, Houston, TX.
- "Role of Nutrient in Gastrointestinal Maturation and Motility," Frank H. Morriss, University of Texas Health Science Center, Houston, TX.
- "Development of the Gastrointestinal Mucosal Barrier," Kam-Yee Pang, Massachusetts General Hospital, Boston, MA.
- "Postnatal Development of Bile Salt Transport," James E. Heubi, Children's Hospital Medical Center, Cincinnati, OH.
- "Metabolism of ¹³C Compounds in Digestive Diseases," Peter D. Klein, Baylor College of Medicine, Houston, TX.
- "Maturation of Neonatal Carbohydrate Homeostasis," Richard M. Cowette, Women and Infants Hospital-Rhode Island, Providence, RI.

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- "Body Composition in Neonates," William J. Klish, University of Rochester, Rochester, NY.

- "Cellular Growth of Skeletal Muscles: Influences of Diet," Donald K. Layman, University of Illinois at Urbana-Champaign, Urbana, IL.
- "Measurement of Milk Intake in Newborns," William W. Hay, Jr., University of Colorado Health Sciences Center, Denver, CO.
- "Infant Nutrition and Adipocyte Number," Edward J. Masoro, University of Texas Health Science Center, San Antonio, TX.
- "Genetic and Gestational Influences on Childhood Obesity," Fredda V. Ginsberg-Fellner, Mount Sinai School of Medicine, New York, NY.
- "Conservative Nutritional Energy Substrate in Neonate Nursed Under Radiant Warmer," Stephen Baumgart, Children's Hospital of Philadelphia, Philadelphia, PA.
- "Enteral Feeding Comparison of Whey Based Formula and Human Milk," John A. Kerner, Stanford University, Stanford, CA.
- "Clinical Studies on Human Milk," Buford L. Nichols, Baylor College of Medicine, Houston, TX.
- "Protein Requirements of Normal Infants," Samuel J. Fomon, University of Iowa, Iowa City, IA.
- "Carbohydrate Energy Absorption in Premature Infants," Craig L. Kien, West Virginia University, Morgantown, WV.
- "Physical-Chemical Studies of Fat Absorption in Newborns," Olle C.E. Hernell, Brigham and Women's Hospital, Boston, MA.
- "Infant Milk Feeding and Serum Cholesterol: U.S. Children," Maradee A. Davis, University of California, San Francisco, CA.
- "Infant Folate Nutrition: Effects of Factors in Milk," Neville Colman, Mount Sinai School of Medicine, New York, NY.
- "Dietary Mineral Bioavailability in Premature Infants," Richard A. Ehrenkranz, Yale University, New Haven, CT.
- "Calcium and Phosphorous Nutrition in High-Risk Infants," Reginald C. Tsang, University of Cincinnati, Cincinnati, OH.
- "Rickets in Low Birth Weight Infant: Using Human Milk," Winston W.K. Koo, Children's Hospital Medical Center, Cincinnati, OH.
- "Vitamin D. Requirement for Low Birth Weight Infants," Bruce W. Hollis, Case Western Reserve University, Cleveland, OH.
- "Studies of Human Zinc Deficiency," Michael K. Hambidge, University of Colorado Health Sciences Center, Denver, CO.
- "Pathogenesis of Neonatal Jaundice and Kernicterus," Lawrence M. Gartner, University of Chicago, Chicago, IL.

Composition of Human Milk

- "Conference on Methods for the Analysis of Human Milk," Robert G. Jensen, University of Connecticut, Storrs, CT.
- "Identification of Components of Colostrum and Human Milk," Robert G. Jensen, University of Connecticut, Storrs, CT.
- "Identification of Components of Colostrum and Human Milk," Margit Hamosh, Georgetown University, Washington, DC.
- "Research in Perinatal Medicine," Ian Gross, Yale University, New Haven, CT.

- "Evaluation of the Nutritional Quality of Preterm Human Milk," Richard Ehrenkranz, Yale University, New Haven, CT.
- "Purification, Characterization of Milk Growth Factors," Michael Klagsbrun, Children's Hospital Medical Center, Boston, MA.
- "Regulation of Triglyceride Composition of Milk," Stuart Smith, Children's Hospital Medical Center of Northern California, Oakland, CA.
- "The Choline Content of Milk," Steven H. Zeisel, Boston University, Boston, MA.
- "Characterization of Membrane Material in Human Milk," Stuart Patton, University of California-San Diego, La Jolla, CA.
- "Taurine, Carnitine, and Amino Acids in Human Milk," Peggy R. Borum, Vanderbilt University, Nashville, TN.
- "Bioavailability of Trace Metals in Human Milk," Rodney R. Howell, University of Texas Health Science Center, Houston, TX.
- "Human Milk Selenium Content and Distribution," Mary F. Picciano, University of Illinois at Urbana-Champaign, Urbana, IL.
- "Thyroid Hormone in Preterm Breast Milk," Gilberto R. Pereira, Children's Hospital of Philadelphia, Philadelphia, PA.

Immunological Aspects

- "Immune Regulation of Human Milk," Larry K. Pickering, University of Texas Health Science Center, Houston, TX.
- "Immunologic Defenses Against Infection in Human Milk," Margaret A. Keller, Los Angeles County Harbor-UCLA Medical Center, Torrance, CA.
- "Identification of Components of Colostrum in Human Milk," Margaret A. Keller, Los Angeles County Harbor-UCLA Medical Center, Torrance, CA.
- "Immune Responses of Newborns to Ingested Antigens," Richard M. Rothberg, University of Chicago, Chicago, IL.
- "Human Milk and Immune Development in Premature Infants," Mark Ballow, University of Connecticut, Farmington, CT.
- "Immunocompetence of Colostrum during Viral Infections," Pearay L. Ogra, Children's Hospital, Buffalo, NY.
- "Colostrum Cell Markers, Function and Regulation," Ellen Richie, University of Texas Health Science Center, Houston, TX.
- "The Effect of Colostrum on Gut Maturation and Host Defense," Allan W. Walker, Massachusetts General Hospital, Boston, MA.
- "Immunological Characterization of Human Colostrum Cells," Sylvia Crago, University of New Mexico, Albuquerque, NM.
- "Effects of Colostrum on Immune Responsiveness," John F. Halsey, University of Kansas, Kansas City, KS.
- "Dynamics of Lymphocyte Transfer to the Newborn," Leonard L. Seelig, Jr., University of Texas Health Science Center, Dallas, TX.
- "Intestinal Macromolecular Transport and Neonatal Liver," John N. Udall, Jr., Harvard University, Boston, MA.

- "Perinatal Infections, Immunity, and Maldevelopment," Charles A. Alford, Jr., University of Alabama in Birmingham, Birmingham, AL.
- "Antibody Secretion, Cytotoxicity and Immune Reaction," Steve Kohl, University of Texas Health Science Center, Houston, TX.
- "Epidemiology of Infant Botulism," James Chin, California State Department of Health Services, Berkeley, CA.
- "Nutritional Risk Factors and Penalty of Meningitis," Bettylou Sherry, Children's Orthopedic Hospital and Medical Center, Seattle, WA.

Human Milk Banks

- "Optimization of Human Milk Heat Treatment," Ronald R. Eitenmiller, University of Georgia, Athens, GA.
- "Human Milk Bank," William C. Heird, Columbia University, New York, NY.
- "Human Milk Banking Studies," Richard A. Ehrenkranz, Yale University, New Haven, CT.
- "Human Milk Banking Studies," Margaret C. Neville, University of Colorado Health Sciences Center, Denver, CO.

APPENDIX C

RESEARCH ON HUMAN LACTATION AND BREASTFEEDING SUPPORTED BY THE U.S. DEPARTMENT OF AGRICULTURE*

Physiology of Lactation

- "Effect of Maternal Dietary Lipid on Prostaglandin Content of Human Milk and Infant Plasma," M.C. Craig-Schmidt, Auburn University, Auburn, AL.
- "Failure to Thrive at the Breast," C.A. Johnson, Baylor College of Medicine, Houston, TX.
- "Control of Sodium in Breast Milk," B.S. Keenan, Baylor College of Medicine, Houston, TX.

Maternal Nutrition Aspects

- "Social Factors Influencing Rapid, Radical Dietary Change in American Adults," L.E. Grivetti, Agricultural Experiment Station, University of California, Davis, CA.
- "Human Calcium Requirements and Metabolism During Lactation," J.L. Kirkland, Baylor College of Medicine, Houston, TX.
- "Nutrient Levels and Metabolism in Pregnancy," A. Kirksey, Agricultural Experiment Station, Purdue University, West Lafayette, IN.
- "The Effect of Dietary Zinc Supplementation on the Zinc Status of Lactating Women," P.B. Moser, Agricultural Experiment Station, University of Maryland, College Park, MD.
- "Nutritional Requirements for Women During Pregnancy and Lactation," B.L. Nichols, Baylor College of Medicine, Houston, TX.
- "Early Developmental Effects of Marginal Vitamin B-6 Nutrition," R.D. Reynolds, Beltsville Human Nutrition Research Center, Agricultural Research Service, Beltsville, MD.

Infant Physiology

- "Proteolytic Degradation of Human Milk Lactoferrin in Infants," B.L. Lonnerdal, Agricultural Experiment Station, University of California, Davis, CA.

Infant Nutrition Aspects

- "Metal Absorption by Infants," P. Johnson, Grand Forks Human Nutrition Research Center, Agricultural Research Service, Grand Forks, ND.

*Source: Federal Human Nutrition Research and Information Management System, 1984.

- "Factors Influencing the Nutrient Intake and Growth of Breast-Fed Infants," A. Kirksey, Agricultural Experiment Station, Purdue University, West Lafayette, IN.
- "Factors Influencing Folate Status During Infancy," M.F. Picciano, Agricultural Experiment Station, University of Illinois, Urbana, IL.

Composition of Human Milk

- "Lipids in Breast Milk and Their Digestion," R.M. Clark, Agricultural Experiment Station, University of Connecticut, Storrs, CT.
- "Dietary Fat and Prostaglandin Content of Human Milk," M.C. Craig-Schmidt, Agricultural Experiment Station, Auburn University, Auburn, AL.
- "Micronutrients and Protective Agents in Human Milk," R.R. Eitenmiller, Agricultural Experiment Station, University of Georgia, Athens, GA.
- "Trace Elements in Human and Other Milks in Relation to Neonatal Nutrition," L.S. Hurley, Agricultural Experiment Station, University of California, Davis, CA.
- "Trace Elements in Human Milk," C.W. Weber, Agricultural Experiment Station, University of Arizona, Tucson, AZ.
- "Human Milk and Colostrum Components: Effects of Storage and Processing," R. Greenberg, Eastern Regional Research Center, Wyndmoor, PA.

Dietary Practices

- "Dietary Practices and Nutritional Status of Maternal and Infant Populations," L. Vaughan, Agricultural Experiment Station, University of Nebraska, Lincoln, NE.

Infant Feeding Behavior

- "Applying Social Learning and Diffusion Theories to the Study of Infant-Feeding Behavior," L.S. Sims, Agricultural Experiment Station, Pennsylvania State University, University Park, PA.

EVALUATION QUESTIONNAIRE

Dear Reader:

Please take a few minutes to answer some questions about this new publication. Your response will help us evaluate recent efforts to disseminate information and stimulate activities to promote breastfeeding. Once you have completed the questionnaire please fold it, seal with tape, and mail. No postage is necessary. Thank you for your assistance.

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